Docket No.: 07754/046001
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Michael Masterov et al.

Application No.: 10/815,157 Confirmation No.: 8197

Filed: March 31, 2004 Art Unit: 3694

For: METHOD AND APPARATUS FOR DETECTING HIGH-ENERGY RADIATION USING A PULSE MODE ION CHAMBER Examiner: D. L. Greene

MS: Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
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APPELLANTS' AMENDED BRIEF UNDER 37 CFR §41.37

Pursuant to 37 CFR §41.37, please consider the following Appellant's Brief in the referenced application currently before the Board of Patent Appeals and Interferences.

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OTHER AUTHORITIES

I. REAL PARTY OF INTEREST

The real party of interest for the referenced application is Thermo Fisher Scientific Inc. An Assignment transferring all interest in the referenced application from the inventors to Thermo Electron Corporation was filed with the USPTO on March 31, 2004. The Assignment was recorded at Reel 015180, Frame 0232. Subsequently, a Request to change assignee name with a copy of Certificate of Amendment of Third Amended and Restated Certificate of Incorporation was filed on December 15, 2006. An Assignment transferring all interest in the referenced application from Thermo Electron Corporation to Thermo Fisher Scientific Inc. was recorded at Reel 018706, Frame 0227.

II. RELATED APPEALS AND INTERFERENCES

To the best of the knowledge of the Appellants and Appellants' legal representative, there are no other appeals or interferences that will directly affect, be affected by, or have a bearing on the decision of the Board of Patent Appeals and Interferences ("the Board") in this appeal.

III. STATUS OF CLAIMS

U.S. Application Serial No. 10/815,157 ("the '157 Application") was filed on March 31, 2004. As filed, the '157 Application included claims 1-12. In a response to a Restriction Requirement filed March 13, 2006, Group I, claims 1-9, was elected with traverse and new claim 13 was added. Subsequently, in a response to an Office Action filed September 1, 2006, claim 3 was canceled, claims 1, 2, and 4-9 were amended, and claims 10-13 were withdrawn. In a response to a final Office Action filed June 20, 2007, claims 1, 5, and 9, were amended. Further, in a response to an Office Action filed January 2, 2008, claim 1 was amended.

Accordingly, claims 1-2 and 4-9 are currently pending in the '157 Application. Claim 1 is independent. The remaining claims depend, either directly or indirectly, from claim 1.

A request for Pre-Appeal review was filed on July 15, 2008, and a Notice of Panel Decision from Pre-Appeal Brief Review was mailed on September 2, 2008.

As such, all claims 1-2 and 4-9 stand finally rejected under 35 U.S.C. §103(a) as obvious over the cited references. Appellant therefore respectfully appeals the final rejection of claims 1-2 and 4-9, asserting they are not rendered obvious by the proposed combination of references.

IV. STATUS OF AMENDMENTS

All of the amendments to date have been entered and considered by the Examiner. No amendments have been filed subsequent to the Final Office Action dated April 15, 2008. The claims of record are presented in the Claims Appendix.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 requires, in part, applying a voltage pulse for a predetermined time between electrodes in an ion chamber, wherein the ion chamber is filled with a gas capable of forming charged ions by high-energy radiation, then, measuring an ion current signal related to ion currents induced by the voltage pulse while the voltage pulse is being applied to the electrodes, then, measuring a leakage current signal after the voltage pulse has been turned off and after ion transport has stopped, and, then, determining a magnitude of the high-energy radiation flux dependent on the ion current signal and the leakage current signal.

A method for measuring high energy radiation flux is described in paragraphs [0031] – [0035] and [0053], and Figures 4 and 5 of the publication of the Specification. With reference to Figures 4 and 5, for example, an ion transport voltage is turned on in step 52, then, an ion current is measured in step 53, and, then, a leakage current is measured in step 55. Then, "[t]he difference between the measurements taken in step 53 and 55 is used to derive the ion currents that result from high-energy radiation flux." *See, e.g.,* Publication of the Specification, paragraph [0035].

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The present Appeal addresses the following grounds of rejection:

- Whether claims 1, 2, and 4-9 are unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 3,873,840 (hereinafter "Ellis") in view of U.S. Patent No. 4,763,343 (hereinafter "Yanaki") or U.S. Patent No. 5,327,029 (hereinafter "Ericson").

- Whether claims 1, 2, and 4-9 are unpatentable under 35 U.S.C. §103(a) over Ellis in view of either Yanaki or Ericson and further in view of any of U.S. Patent No. 3,045,123 ("Frommer"), an article, "The Photo Electric Effect Experiment 2-8" ("Experiment 2-8"), or U.S. Patent No. 5,905,262 ("Spanswick").

- Whether claims 5 and 9 are unpatentable under 35 U.S.C. §103(a) over Ellis in view of either Yanaki or Ericson and further in view of U.S. Patent No. 6,889,152 ("More").

- Whether claims 5 and 9 are unpatentable under 35 U.S.C. §103(a) over Ellis in view of either Yanaki or Ericson in view of any of Frommer, Experiment 2-8, or Spanswick and further in view of More.

VII. ARGUMENT

A. Claims 1-2 and 4-9 are patentable over Ellis, Yanaki, and Ericson

In this appeal, Applicant respectfully argues independent claim 1 is patentable over Ellis, Yanaki, and Ericson. Dependent claims 2 and 4-9 are patentable for at least the same reasons. Thus, for the purpose of this appeal, claims 1, 2, and 4-9 stand or fall together.

(1) Measuring a leakage current signal after the voltage pulse has been turned off, after ion transport has stopped, and after measuring the ion current signal is not shown or suggested.

Applicant respectfully asserts that Ellis, Yanaki, and Ericson, whether taken separately or in combination, fail to show or suggest at least "measuring a leakage current signal after the voltage pulse has been turned off, after ion transport has stopped, and after measuring the ion current signal," as required by independent claim 1.

As an initial matter, the Examiner does not point to any specific aspect of Ellis which *explicitly* shows or suggests "measuring a leakage current signal after the voltage pulse has been turned off, after ion transport has stopped, and after measuring the ion current signal," as recited in independent claim 1. *See* Office Action dated April 15, 2008, at page 3.

In fact, Ellis teaches nothing more than a gamma signal subtracted from a signal including the gamma signal and neutron signal. *See* Ellis, Abstract, column 5, lines 6-9 and 17-21. Thus, Ellis not only fails to show or suggest "*measuring a leakage current signal*" but also fails to show *a specific way or timing of* "*measuring a leakage current signal*" as claimed.

The Examiner alleges that Ellis *inherently* teaches measuring and removing the leakage current because Ellis teaches subtracting a gamma signal from a neutron signal. Thus, the Examiner alleges that because both a gamma signal and a neutron signal contain a leakage current, Ellis subtracts the leakage current. *See* Office Action dated April 15, 2008, at page 3. Applicant respectfully disagrees.

As explained above, Ellis teaches nothing more than subtracting a gamma signal from a signal that has both a gamma signal and a neutron signal. Applicant respectfully asserts that subtracting one signal from another and subtracting the leakage current do not *necessarily* or *inherently* lead to *measuring a leakage current*, as required by independent claim 1, because it would be clear to a skilled artisan that, for example, a noise signal may be removed by a noise filter without measuring the noise signal.

MPEP § 2112 states that "[t]he fact that a certain result or characteristic *may* occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. . . . In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art."

Thus, the Examiner has failed to establish that Ellis shows or suggests "*measuring a leakage current signal,*" as claimed. Because Ellis fails to show or suggest "measuring a leakage signal," Ellis necessarily cannot show or suggest at least measuring the leakage current signal as claimed.

(2) Yanaki fails to supply that which Ellis lacks and expressly teaches away from the claimed invention.

Yanaki fails to supply that which Ellis lacks. In fact, Yanaki is completely silent with respect to the above limitation of independent claim 1, and Yanaki expressly *teaches away* from the claimed invention.

Specifically, Yanaki clearly discloses a *filter for removing noise. See* Yanaki, column 13, lines 60-66. Thus, Yanaki discloses removing, rather than measuring a noise signal as recited in claim 1. It is clear to a skilled artisan that a noise filter removes a noise signal, but does not measure a noise signal. As the Board is aware, a *prima facie* case of obviousness may be rebutted by showing that the art, in any material respect, teaches away from the claimed invention. *See* MPEP § 2145. As noted, not only does Yanaki fail to disclose measuring a signal, Yanaki discloses removing the signal, making it impossible to measure.

(3) Ericson fails to supply that which Ellis and Yanaki lack.

Applicant respectfully asserts that Ericson fails to supply that which Ellis and Yanaki lack.

In fact, Ericson is completely silent with respect to "measuring a leakage current signal after the voltage pulse has been turned off, after ion transport has stopped, and after measuring the ion current signal," as required by independent claim 1.

Specifically, Ericson merely discloses that a leakage current may be included in an input signal, and, thus, the input devices are carefully selected. *See* Ericson, column 5, lines 49-53. Then, Ericson merely discloses that a capacitor is used to minimize a leakage current to the input node. *See* Ericson, column 6, lines 25-26. Thus, it is clear to a skilled artisan that Ericson is completely silent with respect to measuring a leakage current at a particular timing as claimed.

In view of above, Ellis, Yanaki, and Ericson, whether taken separately or in combination, fail to show or suggest at least "measuring a leakage current signal after the voltage pulse has been turned off, after ion transport has stopped, and after measuring the ion current signal," as required by independent claim 1.

(4) The Examiner's articulation of the reasons why the claimed invention would have been obvious is improper.

Applicant respectfully asserts that the Examiner's articulation of the reason(s) why the claimed invention would have been obvious is improper in view of the Supreme Court's recent decision in *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 USPQ2d 1385, 1395-97 (2007). In *KSR*, the Supreme Court reiterated the primacy of the analytical framework provided in *Graham v. John Deer Co.*, 383 U.S. 1, 148 USPQ 459 (1966). Accordingly, the Court

concluded that obviousness is a question of law based on underlying factual inquiries. The factual inquiries enunciated by the Supreme Court include:

(1) Determining the scope and content of the art;

(2) Ascertaining the differences between the claimed invention and the prior art; and

(3) Resolving the level of ordinary skill in the pertinent art.

Ascertaining the differences between the claimed invention and the prior art requires interpreting the claim language and considering both the invention and the prior art as a whole. An obviousness rejection should also include an indication of the level of ordinary skill found in the art. Further, the Examiner must make a finding that one of ordinary skill in the art could have combined the elements as claimed by known methods, and that in combination, each element merely would have performed the same function as it did separately.

After the Graham factual inquiries are resolved, the Examiner must determine whether the claimed invention would have been obvious to one of ordinary skill in the art. MPEP § 2143 states that "[t]he key to supporting any rejection under 35 U.S.C. § 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious." The Supreme Court in *KSR International Co. v. Teleflex Inc.* noted that the analysis supporting a rejection under 35 U.S.C. § 103 should be made explicit. *See* MPEP § 2143. Therefore, the Examiner must explain why the difference(s) between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art.

Here, the Examiner alleges that Ericson discloses that the input devices are carefully selected in order to measure an input signal accurately because a leakage current may be

included in the input signal, and, thus, the above limitation of claim 1 is obvious to the skilled artisan. *See* Office Action dated April 15, 2008, at page 4.

In the present case, Applicant respectfully asserts that the Examiner's analysis constitutes mere conclusory statements, rather than articulated reasoning with rational underpinning, as the Supreme Court requires for a finding of obviousness. *See KSR Int'l Co. v. Teleflex, Inc.*, 82 U.S.P.Q.2d 1385, 1396 (2007). Because the Examiner has failed to proffer any analysis under the factual inquiries articulated by the Supreme Court, a finding of obviousness is improper. Simply put, rather than provide an explanation as to why a skilled artisan would modify the prior art, the Examiner merely makes conclusory statements.

In view of above, Ellis, Yanaki, and Ericson, whether taken separately or in combination, fail to show or suggest the invention as recited in independent claim 1. Also, the Examiner's articulation of the reasons why the claimed invention would have been obvious is improper. Accordingly, independent claim 1 is patentable over Ellis, Yanaki, and Ericson. Dependent claims are allowable at least by virtue of their dependencies. Reversal of the rejection is respectfully requested.

B. Claims 1-2 and 4-9 are patentable over Ellis, Yanaki, Ericson, Frommer, Experiment 2-8, and Spanswick

In this appeal, Applicant respectfully argues independent claim 1 is patentable over Ellis, Yanaki, Ericson, Frommer, Experiment 2-8, and Spanswick. Dependent claims 2 and 4-9 are patentable for at least the same reasons. Thus, for the purpose of this appeal, claims 1, 2, and 4-9 stand or fall together.

(1) Ellis, Yanaki, and Ericson fails to show or suggest the invention recited in independent claim 1.

As discussed above, Ellis, Yanaki, and Ericson fail to show or suggest the invention recited in independent claim 1.

(2) Zeroing out a detector cannot be equated with the invention recited in independent claim 1.

Applicant respectfully asserts that a mere zeroing out a detector cannot be equated with the invention recited in independent claim 1.

The Examiner alleges that Ellis, Frommer, Experiment 2-8, or Spanswick discloses a procedure of zeroing out of a detector, and the procedure corresponds to the claimed invention. *See* Office Action dated April 15, 2008, at page 7.

However, even assuming *arguendo* that it is old and well known to zero a detector before using it as alleged by the Examiner, the procedure of zeroing out a detector does not show or suggest at least the invention recited in independent claim 1.

Applicant respectfully asserts that the procedure of zeroing out necessarily cannot show or suggest at least the specific order of the steps, (a) measuring an ion current signal induced by the voltage pulse, then, (b) measuring a leakage current signal after the voltage pulse has been turned off and after ion transport has stopped, and, then, (c) determining magnitude of the high-energy radiation flux based on the ion current signal and the leakage current signal, as required by independent claim 1.

One skilled in the art would readily recognize that the procedure of zeroing out is conducted as follows: (i) a detector may be affected by a leakage current signal before applying a voltage to a circuit to be measured, then, (ii) the position of zero showed by the detector is adjusted, and, then, (iii) an ion current signal of the circuit is measured by the detector.

Thus, a skilled artisan would readily recognize that, in the procedure of zeroing out a detector, *an ion current signal, which does not include a leakage signal, is measured* because the effect of the leakage current signal is removed when zeroing out the detector. Also, a magnitude of the high-energy radiation flux is determined *only based on the ion current signal*. Further, a leakage signal may appear on the detector *before* applying a voltage to a circuit to be measured.

Therefore, the procedure of zeroing out a detector necessarily cannot show or suggest the specific order of the steps, (a) *measuring an ion current signal* induced by the voltage pulse, then, (b) measuring a leakage current signal *after* the voltage pulse has been turned off and after ion transport has stopped, and, then, (c) determining magnitude of the high-energy radiation flux *based on the ion current signal and the leakage current signal.*

(3) The Examiner is using impermissible hindsight in rejecting the claims as obvious over the applied prior art.

Applicant respectfully asserts that the Examiner has not provided any evidentiary support with respect to his analysis and that unsupported statements and conclusions of obviousness are considered inadmissible hindsight. *See, e.g.*, *In re Geiger*, 2 USPQ2d 1276 (Fed. Cir. 1987), *Panduit Corp. v. Dennison Mfg. Co.*, 1 USPQ2d 1593 (Fed. Cir. 1987), *In re Gordon*, 221 USPQ

1125 (Fed. Cir. 1984), *Ex parte Clapp*, 227 USPQ 972 (Pat. Off. Bd. App. & Inter. 1985), *Ex parte Shepard and Gushue*, 188 USPQ 537 (Pat. Off. Bd. App. 1974).

In fact, the Examiner merely alleges "it is considered obvious to zero out the detector at ANY POINT in order to ensure the reading is accurate" and "it is considered obvious that one would want to zero out the detector AFTER the measurement for the benefit of compensating for any drift that occurred since the last time the detector was zeroed out." *See* Office Action dated April 14, 2008, at page 7.

However, none of the Examiner's statements are supported by the prior art, and the statements are, therefore, without legal basis.

In view of above, Ellis, Yanaki, Ericson, Frommer, Experiment 2-8, and Spanswick, whether taken separately or in combination, fail to show or suggest the invention as recited in independent claim 1. Also, the Examiner is using impermissible hindsight in rejecting the claims as obvious over the applied prior art. Accordingly, independent claim 1 is patentable over Ellis, Yanaki, Ericson, Frommer, Experiment 2-8, and Spanswick. Dependent claims are allowable at least by virtue of their dependencies. Reversal of the rejection is respectfully requested.

C. Claims 5 and 9 are patentable over Ellis, Yanaki, Ericson, and More

In this appeal, Applicant further argues that claims 5 and 9 are patentable over Ellis, Yanaki, Ericson, and More, whether viewed separately or in combination, for at least the reasons below. For the purpose of this appeal, claims 5 and 9 stand or fall together.

(1) More does not supply what Ellis, Yanaki, and Ericson lack.

As discussed above, independent claim 1 is patentable over Ellis, Yanaki, and Ericson. More does not supply what Ellis, Yanaki, and Ericson lack. This is evidenced by the fact that More is relied on merely to provide the details such as adjusting gain of an amplifier and applying a ramping voltage. *See* Office Action dated April 15, 2008, at page 8.

In view of above, independent claim 1 is patentable over Ellis, Yanaki, Ericson, and More. Dependent claims 5 and 9 are allowable at least for the same reasons. Accordingly, reversal of this rejection with respect to claims 5 and 9 is respectfully requested.

D. Claims 5 and 9 are patentable over Ellis, Yanaki, Ericson, Frommer, Experiment 2-8, Spanswick and More

In this appeal, Applicant further argues that claims 5 and 9 are patentable over Ellis, Yanaki, Ericson, Frommer, Experiment 2-8, Spanswick, and More, whether viewed separately or in combination, for at least the reasons below. For the purpose of this appeal, claims 5 and 9 stand or fall together.

(1) More does not supply what Ellis, Yanaki, Ericson, Frommer, Experiment 2-8, and Spanswick lack.

As discussed above, independent claim 1 is patentable over Ellis, Yanaki, Ericson, Frommer, Experiment 2-8, and Spanswick. More does not supply what Ellis, Yanaki, and Ericson lack. This is evidenced by the fact that More is relied on merely to provide the details such as adjusting gain of an amplifier and applying a ramping voltage (*see, e.g.*, Office Action dated April 15, 2008, at page 8).

In view of above, independent claim 1 is patentable over Ellis, Yanaki, Ericson, Frommer, Experiment 2-8, Spanswick, and More. Dependent claims 5 and 9 are allowable at least for the same reasons. Accordingly, reversal of this rejection with respect to claims 5 and 9 is respectfully requested.

VIII. CONCLUSION

In view of the above, the Examiner's arguments do not support the rejection of claims 1-9 under 35 U.S.C. §103(a). Accordingly, a favorable decision from the Board is respectfully requested.

Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference 07754/046001).

Dated: December 31, 2008

Respectfully submitted,

By: _____

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IX. CLAIMS APPENDIX

1. A method for measuring high-energy radiation flux, comprising:

applying a voltage pulse for a predetermined time between electrodes in an ion chamber, wherein the ion chamber is filled with a gas capable of forming charged ions by high-energy radiation;

measuring an ion current signal related to ion currents induced by the voltage pulse while the voltage pulse is being applied to the electrodes;

measuring a leakage current signal after the voltage pulse has been turned off, after ion transport has stopped, and after measuring the ion current signal;

determining a magnitude of the high-energy radiation flux dependent on the ion current signal and the leakage current signal after measuring the leakage current signal; and

outputting the result of the magnitude of the high-energy radiation flux.

2. The method of claim 1, wherein the determining the magnitude of the high-energy radiation flux comprises subtracting the leakage current signal from the ion current signal.

3. (Cancelled)

4. The method of claim 1, further comprising determining a gain of an amplifier of the ion current signal and the leakage current signal.

5. The method of claim 4, wherein the determining the gain of the amplifier comprises applying a ramping voltage between the electrodes in the ion chamber.

6. The method of claim 4, wherein one of a magnitude of the ion current signal and a magnitude of the leakage current signal is adjusted dependent on the gain of the amplifier.

7. The method of claim 6, wherein the subtracting the leakage current signal from the ion current signal is dependent on one of a magnitude-adjusted ion current signal and a magnitude-adjusted leakage current signal.

8. The method of claim 1, further comprising determining a gain of an amplifier of the ion current signal and the leakage current signal, wherein the magnitude of the high-energy radiation flux is proportional to the ion current signal and the gain of the amplifier.

9. The method of claim 8, wherein the determining the gain of the amplifier comprises applying a ramping voltage between the electrodes.

10. (Withdrawn) A system for measuring high-energy radiation, comprising:
    an ion chamber having an ionizable material that can be ionized by the high-energy radiation;
    two electrodes disposed in the ion chamber; and
    a circuit connected to the two electrodes, wherein the circuit is configured to provide a voltage pulse to the two electrodes and to measure an electrical signal across the two electrodes.

11. (Withdrawn) The system of claim 10, wherein the ionizable material comprises one selected from helium-3, boron trifluoride, lithium-6, uranium-233, uranium-235, and plutonium-239.

12. (Withdrawn) The system of claim 10, further comprising a target chamber comprising a hydrogenous material, wherein the target chamber is disposed proximate the ion chamber, and wherein the high-energy radiation comprises neutron radiation.

13. (Withdrawn) A method for measuring high-energy radiation using the system of claim 10.

X. EVIDENCE APPENDIX

No evidence of the types described in 37 CFR § 41.37(c)(1)(ix) has been submitted during prosecution of the present application.

XI. RELATED PROCEEDINGS APPENDIX

As indicated in Section II *supra*, to the best knowledge of Appellant and the Appellant's legal representative, there are no decisions rendered by a court or the Board that may directly affect, be affected by, or have a bearing on the decision of the Board in the pending appeal.